

REMARKS

The Examiner has rejected claims 1-2, 8-19, 21, 28, 32-33 and 35-41 under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 1-2, 8-19, 21, 28, 32-33 and 35-41 are rejected under § 103(a) as being unpatentable over Gupta U.S. Patent No. 5,824,375. Claims 16, 28, 32-33 and 40 are rejected under § 103(a) as being unpatentable over Gupta in view of Discenzo U.S. Patent No. 6,950,193. The Examiner has withdrawn from consideration claims 3-7, 22, 26 and 27. The following remarks are respectfully submitted.

Although Applicants disagree with the assertion that the preamble is vague and confusing, claims 1 and 35 are amended to recite in the preamble that the method is for “decreasing the frequency of” chamber cleaning processes. Obviously, Applicants invention is not aimed at providing persons with time to go to the store, as one skilled in the art could clearly comprehend from the specification. “Time” refers to operation time for the process chamber, and it is the operation time of the chamber that is extended by the method of the invention before cleaning of the chamber must occur. Certainly, the specification sheds light on the meaning and scope of the claims, such that there is no need for Examiner to guess at applicants’ intention or to speculate with ridiculous possibilities. As is clear from the specification, the invention is directed to increasing the number of substrates that can be processed in the process chamber, or alternatively stated, to increase the number of sequential processes that can be performed in the chamber, before processing must be interrupted to subject the chamber to a cleaning process to restore proper manufacturing conditions. One skilled in the art is capable of understanding that this goal may be phrased, for example, as “extending the time between chamber cleaning processes” or “decreasing the frequency of chamber cleaning processes.” It is respectfully requested that the rejection under § 112 be withdrawn.

With respect to the rejections under § 103 over the cited art, Applicants object for the reason that the elected claims were subject to examination based on the non-elected subject matter. Examiner previously issued a species restriction in which the species were identified as: Species A (claims 3-7, 22, 26 and 27 read on) directed to an embodiment wherein the particle-reducing film is an oxide formed on the first film deposit, and Species B (claims 8, 28, 32-33 and 35-41 read on)

directed to an embodiment wherein the particle-reducing film is a nitride film formed from at least a portion of the first film deposit. Claims 1-2, 9-19 and 21 are generic. In the response filed 04/17/2008, Applicants elected Species B, i.e., where the particle-reducing film is a nitride film formed from at least a portion of the first film deposit. Yet, Examiners rejections refer to the cited reference Gupta as having a seasoning step that “reads on the claimed limitation of an oxide film formed on a first film deposit.” That limitation reads on non-elected Species A, not elected species B. In other words, Examiner withdrew the non-elected Species A claims, and proceeded to examine the Generic claims and elected Species B claims using rationale and art directed to Species A. Applicant is entitled to examination of elected Species B, and thus, any next action directed to Species B should be non-final. Furthermore, because Examiner has already attempted to examine non-elected Species A and must provide examination of elected Species B, it is asserted that there is no longer a justification for maintaining the restriction, and all claims should be subject to examination in the next action, which should be made non-final if not an allowance. Despite the improper examination of Species B claims using Species A rationale and art, Applicants will attempt to address the rejections to the extent possible.

With respect to the rejection over Gupta, Applicants traverse. Of the rejected claims, claims 1 and 35 are independent claims, where claim 1 is generic to Species A and B and Claim 35 reads on Species B. While Gupta is also concerned with contaminants in the chamber, he does not teach or suggest the steps of the claimed method. First and foremost, there is no teaching or suggestion that the particle-reducing film is a nitride (or oxide or oxynitride) *formed from at least a portion of the first film deposit*, as recited in claim 1, nor does Examiner assert that there is such a teaching or suggestion since that limitation reads on Species B whereas Examiner wrongly examined Species A. There is also no teaching or suggestion of exposing the first film deposit to the recited gases to chemically modify at least a portion of the first film deposit to form the particle-reducing film, as recited in claim 35 and dependent claim 8.

Second, Examiner asserts that Gupta’s seasoning step reads on the claim limitation for forming the particle-reducing film, that the plasma deposition of silicon oxide reads on the second

manufacturing step, and that there must have been a first manufacturing step, else there would be no need for Gupta's cleaning and seasoning steps. It is true that there must have been a first manufacturing step in Gupta, and that contaminants and deposited material form on the chamber component as a result of the first manufacturing step which must then be removed by a cleaning process. However, what the Examiner misses the point of in Gupta is that *the cleaning step removes the first film deposit created from that first manufacturing step*. The cleaning step then leaves a contaminant in the form of sorbable fluorine, from a fluorine-containing cleaning gas. That sorbable fluorine would interfere with a second manufacturing process, as explained in Col. 1, lines 36-43 of Gupta. Thus, a seasoning step is performed (without substrates present) to coat the chamber component with the same material as that which will be deposited in the next manufacturing step in order to seal the fluorine therein. Then, the second manufacturing process can be performed. Gupta explains, however, that there is still too high a content of sorbable fluorine left from the cleaning gas. Gupta therefore adds another step between the fluorine cleaning step and the seasoning step, namely an inert plasma exposure and exhaust to remove sorbable fluorine from the chamber so that there is less sorbable fluorine present that must be sealed in with the seasoning coating. It is important to note that Gupta does nothing to extend the operating time of the chamber between a first and a second manufacturing process by delaying the need for a cleaning operation caused by particle contamination from material deposited on chamber component in the first manufacturing process. Rather, Gupta cleans as usual, and then addresses the problems created by the cleaning gas. Gupta does not teach or suggest a method that would delay the need for using that cleaning gas.

The claimed invention, rather than cleaning when Gupta cleans to remove the first film deposit, exposes the first film deposit to a reactant gas to either (A) form an oxide or oxynitride on the first film deposit, or (B) form a nitride, oxide, or oxynitride from at least a portion of the first film deposit. Unlike Gupta, the first film deposit is *not* initially cleaned off the chamber component, but is covered by or converted to a film that has a reduced likelihood of producing particle contaminants on substrates subsequently processed in the chamber. This method allows for one or more additional substrates to be processed before the chamber operation must be interrupted to allow for a cleaning

process, such as Gupta's, to be performed. Gupta simply does not teach or suggest Species A or B, which include exposing the first film deposit (defined as being formed on the chamber component during the first manufacturing process of one or more first substrates) to a reactant gas to either form a particle-reducing film over it or from it, and then performing a second manufacturing process that deposits a new film over that particle-reducing film. As such, Gupta fails to teach or suggest each and every limitation of the claimed invention, and therefore Examiner has failed to establish a *prima facie* case of obviousness under § 103 over Gupta. Applicants thus respectfully request that the rejection of claims 1-2, 8-19, 21, 28, 32-33 and 35-41 be withdrawn.

With specific reference to claim 9 (and claims 10-15 which depend therefrom) and claim 35 (and claims 36-41 which depend therefrom), Examiner points to col. 1, lines 13-35 as teaching the temperature variation recited in claims 9 and 35. Gupta, in the cited passage, simply explains that plasma CVD can be performed at a lower temperature than thermal CVD. This disclosure does not teach or suggest the claimed method of elevating the temperature from the first temperature used in the first manufacturing process to a second (higher) temperature to perform the exposure to the reactant gas to form the particle-reducing film, followed by returning the temperature to the first (lower) temperature for the second manufacturing process. For at least this additional reason, claims 9-15 and 35-41 are not taught or suggested by Gupta.

With specific reference to claims 14 and 15, which depend from claim 9, and claims 38 and 39, which depend from claim 35, Examiner points to col. 9, lines 9-12 as teaching the specific temperature limitations. Gupta, in the cited passage, simply asserts that the chamber is heated to between 300-500°C, preferably 400°C, and maintained at that temperature throughout PECVD of the SiO<sub>2</sub> in the second manufacturing step. This hardly amounts to a teaching that the first film deposit is exposed to the reactant gas to form the particle-reducing film at a temperature that is 100-300°C *greater* than the temperature at which the first and second manufacturing steps are performed, as recited in claims 14 and 38. And, this hardly amounts to a teaching that, after exposure at the higher second temperature, the chamber temperature is lowered to below the first temperature, and then returned (raised) to the first temperature before introducing the one or more second substrates for the

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second manufacturing process, as recited in claims 15 and 39. For at least this additional reason, claims 14-15 and 38-39 are not taught or suggested by Gupta.

With respect to the rejection over Gupta in view of Discenzo, Discenzo does nothing to cure the deficiencies of Gupta set forth above. Discenzo is merely cited for the purpose of allegedly teaching that SiN can be deposited in a manufacturing step instead of SiO<sub>2</sub>. Discenzo does not teach or suggest exposing a first film deposit to a reactant gas to form a particle-reducing film, as recited, and thus, there is no *prima facie* case of obviousness under § 103 over Gupta in view of Discenzo. Applicants thus respectfully request that the rejection of claims 1-2, 8-19, 21, 28, 32-33 and 35-41 be withdrawn.

In view of the foregoing amendments to the claims and remarks given herein, Applicants respectfully believe this case is in condition for allowance and respectfully request allowance of the pending claims. If the Examiner believes any detailed language of the claims requires further discussion, the Examiner is respectfully asked to telephone the undersigned attorney so that the matter may be promptly resolved. The Examiner's prompt attention to this matter is appreciated.

Applicants are of the opinion that no additional claims fee is due as a result of this Amendment. Applicants are also of the opinion that a one-month extension of time is due with this Amendment. Payment of all charges due for this filing is made on the attached Electronic Fee Sheet. If any additional charges or credits are necessary to complete this communication, please apply them to Deposit Account No. 23-3000.

Respectfully submitted,  
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